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Magnetic field induced color change in α-Fe2O3 single crystals

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We investigated the magneto-optical properties of α-Fe2O3 in order to understand the interplay between charge and magnetism in a model transition metal oxide. We discovered that hematite appears more red in applied magnetic field than in zero field conditions, an effect that is amplified by the presence of the spin flop transition. Analysis of the exciton pattern on the edge of the d-d color band reveals C2/c monoclinic symmetry in the high field phase. These findings advance our understanding of magnetoelectric coupling away from the static limit and motivate spectroscopic work on other iron-based materials under extreme conditions.

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